# GrummanWorld

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# Grumman Wins Boost Surveillance System Contract

*Competition narrows as Grumman & Lockheed teams win development contracts from USAF Space Command*

On Wednesday, March 18, Grumman was awarded a $304 million contract for further development of the Boost Surveillance and Tracking System (BSTS) program. The U.S. Air Force's Space Division, Air Force Systems Command, made the award.

The Boost Surveillance and Tracking System will use satellites with infrared sensors to detect and track ballistic missiles just after launch. The information is then relayed to U.S. attack warning systems. BSTS is a research program that has applications for the Strategic Defense Initiative.

"This is an important award for us," said Grumman Chairman Jack Bierwirth. "We have invested more than a decade in developing a novel technology to improve infrared sensors for space surveillance systems." The contract is Grumman's largest space-related contract since the Apollo program.

Grumman leads an industry team that includes Ford Aerospace & Communications Corporation's Space Missions Group of Sunnyvale, California; Litton Itek Optical Systems of Lexington, Massachusetts; Raytheon Company's Equipment Division in Sudbury, Massachusetts; and Rockwell International Corporation's Satellite Systems Division of Seal Beach, California.

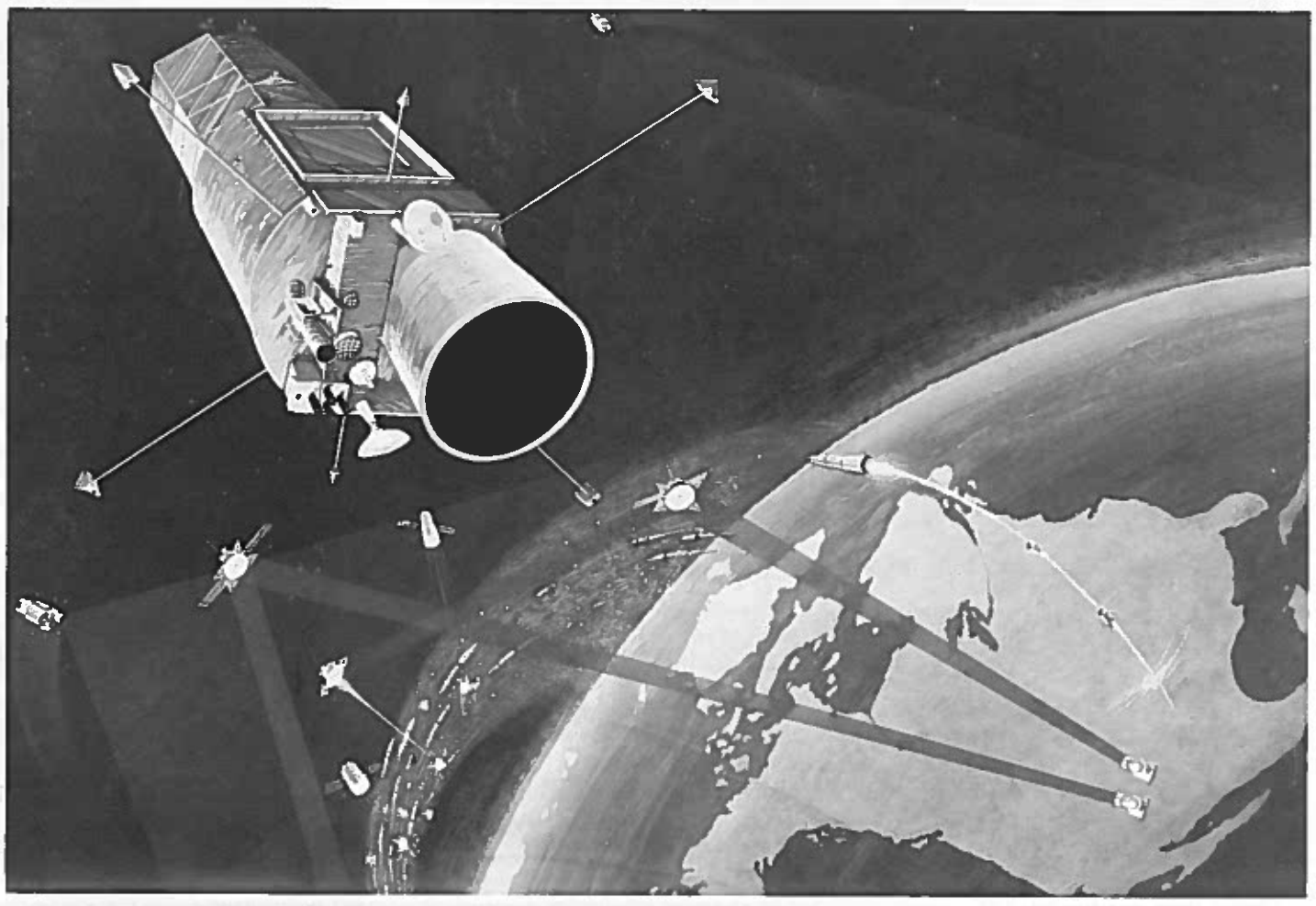
The Grumman team is one of two winners: Lockheed Corporation also won a development contract. The BSTS competition has progressively narrowed since 1984 from an original field of four winners of a mission analysis and requirements study to three concept definition study winners in 1985.

This 34-month contract, part one of the BSTS program demonstration/validation phase, covers demonstration of system design and validation through ground testing. The second part, building an experimental satellite for flight testing in the 1990s, will be a future competition.

From the vantage point of space, the Boost Surveillance and Tracking System can give the earliest warning of an ICBM attack. When an ICBM is launched, it goes through a boost phase that lasts up to five minutes. As the missile's first- and second-stage engines burn, they give off telltale plumes of hot ionized gases that can be detected by the BSTS satellite's infrared sensors. BSTS monitors and tracks the missiles and signals other SDI elements to attack the ICBMs in flight.

Grumman has been developing infrared (IR) sensors and countermeasurers systems since the first successful use of IR in a tactical missile, the Sidewinder, in the late 1950s. In the late 1970s, Grumman developed an IR suppression system for the U.S. Army/Grumman OV-1 Mohawk battlefield surveillance aircraft. Radiation emitted from engine exhausts and hot engine parts was reduced, thus denying IR missile lock-on.

At facilities in Bethpage, N.Y., and Irvine, California, Grumman has spent years developing an infrared mosaic starer sensor system for surveillance satellites. Using an innovative IR packaging technique known as "Z technology," mosiac focal plane sensors are made with data processing chips along the Z-axis. This packaging design greatly reduces the processing load of the sensor's main computers and allows more efficient use of the detector's focal plane.■



**Sentry In Space.** *This artist's rendering shows how Grumman's Boost Surveillance and Tracking System will detect the launch of intercontinental ballistic missiles and signal other components of the SDI system to attack the missiles.*

## *Grumman Boats To Open Assembly Plant In Wisconsin*

Grumman Boats will open a new, final assembly plant in Minong, a town in the northwestern corner of Wisconsin.

"This new plant will give us a manufacturing facility in the heart of the biggest aluminum boat market in the country," says Grumman Boats President Bob Steinway.

The new Grumman plant will build canoes, semi-vees and pontoon boats for dealers serving this area of the state, which is near the western tip of Lake Superior, in addition to dealers in Minnesota and central Canada.

According to Steinway, the area has some 35,000 small-water lakes — and plenty of boaters who need light boats. The region's boaters favor aluminum because the lakes are rocky and the rocks chip away at fiberglass.

"This area has been one of the toughest for us to compete in, because our plants in Marathon, N.Y., and Arkadelphia, Arkansas, are so far away. By the time we ship our boats to the dealers there, the freight costs have cut heavily into our profit," says Steinway.

Bob Link, the owner of Link Recreational, the top Grumman Boats dealer in the area, agrees. "The big problem is freight. With canoes alone, the savings for Grumman will be 20 to 25 percent," says Link, who has been selling Grumman craft since he opened his business 20 years ago.

Grumman will fabricate parts in Marathon, then ship them to Minong for assembly. The now unoccupied Minong plant completes a triangle that gives Grumman Boats effective manufacturing coverage of two-thirds of the nation.

Though Grummanites from the main plant in Marathon, New York, will help launch the operation, the entire 50-person work force will be hired locally. The plant should be ready by June, with full production planned for late this year.■

## *What's Inside*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# *Advanced Simulation Effort Gets New Electronic Brain*

Grumman has purchased a $1.2 million computer system that will be the main processor in a complex, real-time electronic systems simulation program.

The ELXSI System 6400 Series mini-supercomputer is now being installed in the Systems Simulation Development Laboratory of the Engineering Development Center in Bethpage. The ELXSI is part of a program to integrate different kinds of hardware and software into a system that can simulate new weapon systems before they become Grumman products.

"With its versatility and speed, this system is ideal for our real-time simulations," says Howard Sherman, director of the Systems Simulation Development laboratory.

The ELXSI is an advanced, modular computer system that is designed to work readily with the center's other computers and hardware used for advanced simulation work.

Most computers are serial processors. They calculate one operation at a time — which, electronically speaking, is a slow way to calculate. ELXSI is a parallel processor. It breaks the calculations into groups, then works on several groups simultaneously.

However, full-mission testing of new electronic designs demands more than just the ELXSI.

In one part of the Engineering Development Center, a 24-foot dome is being built. Into it, engineers can install one of several aircraft or other vehicle cockpits. The crew will sit in it and see projections of simulated land forms, sea- or airspace, as if they were in a combat situation. The ELXSI supplies the view.

For aircraft projects, with only the smell of jet fuel and the hard pulls of high-g turns missing, the pilot will "test fly" simulated systems under full mission conditions.

This is a major jump in test capability. Now, simulations only evaluate the computer programs contained in a particular system, such as flight controls, separate from the rest of the aircraft's systems.

Moreover, the systems will go up against "real" threats. The computers will project data representing known enemy missiles, radars, electronic warfare systems and other weapon systems onto the dome screen and into the crew's sensing systems and displays. To make it tougher, test engineers will be able to electronically advance a foe's state-of-the-art by creating more potent threats.

The missions will be very realistic. While a crew is inside the dome, others at the controls of "player's stations" can simulate friendly or unfriendly vehicles. The crew inside the dome can monitor the actions of those vehicles and coordinate their actions with friends and counter or attack foe.

"It will be the first time that Grumman will have a full threat scenario, including terrain, weather, sensors, and friendly and enemy vehicles," says Sherman.

In addition to aircraft systems, electronics destined for sea- or land-based requirements can be tested, too. The lab has a broad, general purpose capability that can serve the simulation needs of all Grumman divisions.

Sherman says the lab, the dome, computers — including the ELXSI — and much of the applications software will begin operating before December.■

**Art's Where He Finds It.** *Grumman's scrap yard rose to the expectations of artist Donald Lipski. Several forays into the mounds of unwanted wires and parts of planes turned up lots of raw material for his sculptures. (Photo courtesy of Hillwood Art Gallery)*

# *Sculptor Turns Scrap Metal Into High-Tech Art*

One man's junk is another man's art.

Using broken parts and metallic scraps from Grumman's scrapyard in Bethpage, Donald Lipski has created a one-man show of sculpture for C.W. Post's Hillwood Art Gallery on the Long Island University's campus. The show, titled "Broken Wings: Lipski at Grumman Aerospace," opened last week and closes April 10.

His sculptures have been exhibited in over 30 one-man shows, including the Museum of Modern Art in New York, as well as in London, Paris and in Sweden next month.

His 25 pieces in the Hillwood Art Gallery will certainly give Grummanites a different perspective of the things they make during their workday.

Lipski takes the high-tech rejects and turns them into works of art. Last year, he spent several afternoons rummaging through Grumman's scrapyard across from Building 3 in Bethpage. He foresaw an artistic future for some Plexiglas canopies, but they were not for the taking. He couldn't take everything he wanted from the Grumman junkyard, because anything that has salvage value belongs to the Navy.

"I go rummaging around a scrap yard the way some people would go through a flea market," Lipski says.

He did collect enough junk to transform the industrial castoffs into massive sculptures.

"I put random objects into some new order that makes some sense," says Lipski. "With the visual, I want to provoke something."

Born in Chicago, Lipski creates his sculpture in his Greenpoint, Brooklyn, studio, which was a movie theater before the World War II and then a plastics company.

During the show, visitors will be able to watch him at work. He'll be creating a 25-foot "installation piece" using some Grumman scrap and two tons of broken glass.

Show hours are 10 a.m.-5 p.m., Monday through Friday, and 1-5 p.m. on Sundays. Admission is free. For more information, call (516) 299-2788.■

*Tom McGrath*

*Don Schlegel*

*Jim Reed*

## McGrath Elected Corporate VP

*Schlegel appointed Aerostructures president*

On Thursday, March 19, the board of directors elected Tom McGrath vice president-Aircraft Modifications and Subcontracts for Grumman Corporation. He reports directly to Grumman President John O'Brien.

The board also appointed Don Schlegel president of Aerostructures. Both Schlegel and St. Augustine Divison President Joe Walter report directly to McGrath.

In addition, the board appointed McGrath senior vice president-Production Operations for the Aircraft Systems Division. In this capacity, he reports to Aircraft Systems President Renso Caporali and is responsible for Bethpage, Calverton, Milledgeville and Stuart Operations.

On the same day, the board appointed Jim Reed program vice president-Special Programs for the Melbourne Systems Division. He reports to Division President Al Verderosa.

## New Plant In Benton, Pa., To Open In Fall

The framework and outer walls are up on the Electronics Systems Division's new plant in Benton Park, Pennsylvania. The division plans to manufacture printed circuit boards there, with full production starting around October of this year.

"We're now accepting bids from contractors for the inside work," says Ken Walch, assistant to the vice president of Great River Operations. Walch will be the Benton Park site manager. "We are telling the contractors that we want the work completed by the end of July."

About 40 Grummanites from Long Island will relocate to Benton Park by the end of this year. People who will be hired from the vicinity of the site, which is about 10 miles north of Scranton on the road to Binghamton, New York, will be trained by the Commonwealth of Pennsylvania. The training arrangement is similar to one Electronics Systems had with Maryland to staff the Salisbury facility.■

# Space Station Program Support Work Up For Bids

*Grumman team to bid on NASA contract to manage design and construction of Manned Space Station*

Grumman may play a big role in managing the design and construction of the Manned Space Station of the '90s.

The company is bidding for NASA's newly announced Program Support Contract (PSC). The contract will span 10 years and would involve the efforts of over 1,000 people. They would work closely with NASA management and most would be based in the Washington, D.C., area.

The proposal deadline is April 3; NASA will pick a winner soon thereafter, and the program will start on July 1. A TRW-led team is currently Grumman's sole competitor.

"The Program Support Contract is a great opportunity for Grumman to play a role on the Space Station program and to continue our heritage in the manned space business," says Technical Services President Fred Haise, who is directing the proposal team.

Grummanites from Data Systems, Space Systems, and Technical Services are working almost 'round the clock on the proposal. They've set up shop in Bethpage's Building 25.

Grumman is leading a team that includes Ford Aerospace and Communications Corporation of Detroit, Michigan; Booz, Allen and Hamilton of Bethesda, Maryland; and Wyle Labs of California.

In the request for proposals, NASA defined the work to be done — right down to the number of work hours it will take. Grumman will spell out the mix of new engineers and veterans required and the cost to do the job. There will be three separate proposals — technical, management, and cost.

"Grumman offers an experienced team that has worked on engineering and integration of many complex aircraft and space systems," says Haise. "And this experience covers 57 years involvement with manned systems."

Competition is reduced because prime contractors for any of the four Space Station work packages cannot bid on the Program Support Contract. Though Grumman is a major subcontractor on two of the packages, it is not a prime.

NASA's goal is to have the Space Station in low-earth orbit by 1994. It will be assembled, maintained and modified in orbit, unlike any previous space system. All the work must be done by the small crews aboard the Space Shuttle.

"The Space Station is by far the most challenging space system to be developed in the next decade," Haise says.

The program support contractor will assist NASA in evaluating the technical and schedule performance across the program. The contractor will also develop tests, plans and requirements for verification, assembly, and integration of Space Station components.

In addition to Washington, site program integration offices will be located in Houston, Texas; Greenbelt, Maryland; Cleveland, Ohio; Huntsville, Alabama; and Kennedy Space Center, Florida.

Bidders were given 60 days to respond to the request for proposals. NASA created this contractor requirement in 1987, and needs the PSC quickly onboard to support the NASA Space Station program office in Washington.

As a NASA consultant, General (Ret.) Sam Phillips studied the NASA organization in general and the Space Station program in particular.

Space Station work has been divided into four work packages, with individual NASA centers (Johnson, Kennedy, Lewis, Marshall) responsible for one work package each. Phillips recommended stronger management of the Station focused at Washington, D.C. That created a need for a contractor to assist NASA in overall systems integration at Washington.

"We must be able to handle surge activity," says Haise. "If a pressing need developed to review a technical issue, the PSC should be able to temporarily transfer people from other areas and projects. For instance, if we needed a computer analyst, we would contact Data Systems."■

**Getting Ready To Bid.** *Technical Services Division President Fred Haise is directing Grumman's Program Support Contract proposal team in Building 25. He is holding a model of one of the Manned Space Station modules.*

## Unit Values

The Grumman Employee Investment Plan has reported the following unit values as of January 31, 1987 (compared to December 31, 1986 figures):

**Equity Fund**
4.166 up from 3.797

**Fixed Income Fund**
5.822 up from 5.759

**Guaranteed Income Fund**
2.429 up from 2.407

**Company Stock Fund**
$27.63 up from $24.94

*Note:* It usually takes several weeks to formulate these values. EIP members can call Ext. (111) 54400 (outside Grumman, call 516-575-4400), for a recorded message which is made as soon as the new unit values are available.

## Time To Sign Up For Shareholders Meeting

The annual meeting of Grumman shareholders is scheduled for 2 p.m. on Thursday, April 16, in Building 4, Bethpage. On March 6, Bankers Trust Company, agent for the trustees of the Grumman Employee Investment Plan, began mailing plan members proxy statements and confidential cards for voting at the annual meeting.

Employees are asked to return the completed cards by April 1 to Bankers Trust in the self-addressed, postage-paid envelopes that accompany the proxy statements.

Because Grumman shares obtained through the Investment Plan are held in trust for each individual member, being a plan member does not automatically entitle participants to attend the annual meeting. Only those persons owning shares of record — that is, shares purchased outside the Investment Plan prior to the record date of February 27, 1987 — are eligible to attend.

Grummanites who own company shares as of the record date and who wish to attend the meeting should present their proxy card at any Employee Services office before April 1 in order to pre-register. Your proxy card should then be mailed immediately in the return envelope provided.

## Obituaries

**Joseph Parisi** of ILS Data Systems, Melville, Aircraft Systems Division, died February 14 at the age of 61. He had been with the company since 1963 and resided at 16 Manor Dr., Bethpage, N.Y.

**Eugene P. McCormack** of ILS Operations Support, Bethpage, Aircraft Systems Division, died February 2 at the age of 57. He had been with the company since 1965 and resided at 35 Saddle La., Centereach, N.Y.

## *Personals*

A sincere thanks to all my friends and ESO for their kind expressions of sympathy during the loss of my mother Nettie. **Ross Bracco**

My family and I wish to thank all my co-workers and ESO for their kindness and support on the recent passing of my father. **William P. Kuhmann**

My family and I would like to thank all of our friends and co-workers for their warm and kind expressions of sympathy during the recent loss of my father. **William W. Harwood**

My family and I wish to extend our deepest thanks and appreciation to all our friends, co-workers and ESO for the beautiful flowers and kind expressions of sympathy during the recent loss of our mother. **Dominick and Frank D'Amico**

I wish to thank my friends, co-workers and ESO for their thoughtfulness shown during my recent illness. **Doris Mays**

I wish to extend my deepest thanks and appreciation to all my fellow workers and ESO for the beautiful flowers and kind words of sympathy during the recent loss of my father. **Jeanne Grace**

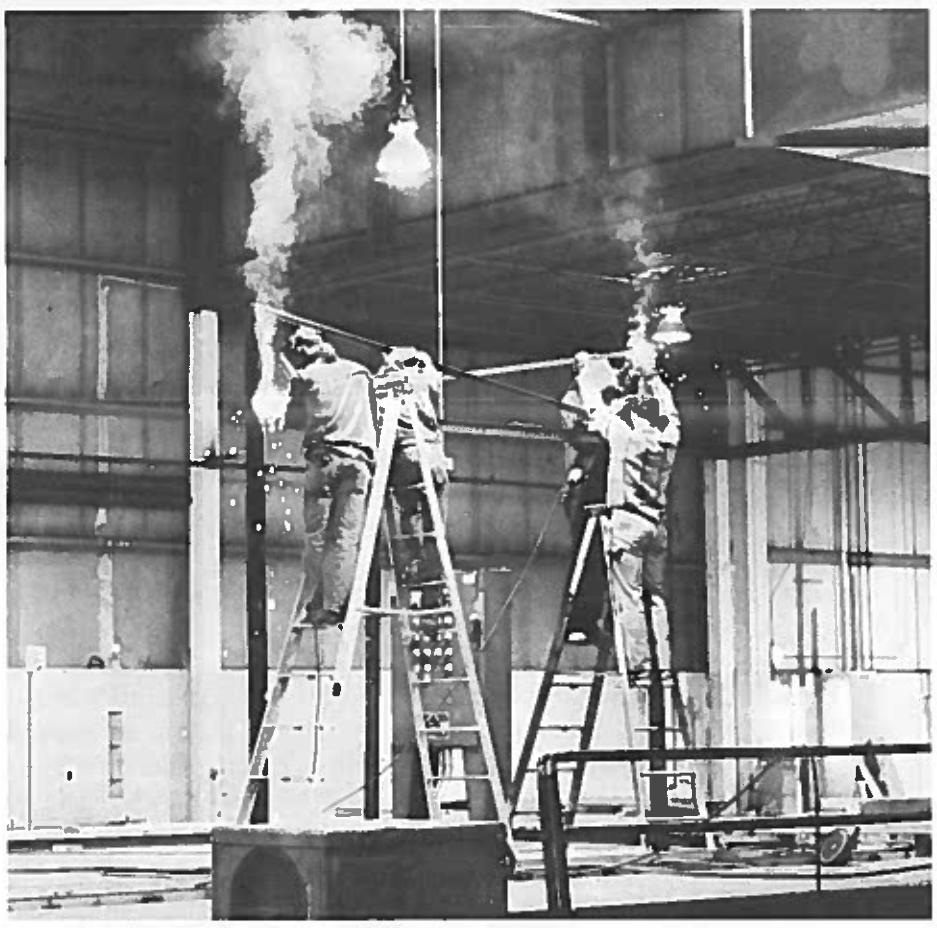
The family of Irene Mahon would like to thank her friends and co-workers at Grumman for their kind expressions of sympathy and support during our recent loss. Your cards and prayers helped us make it through a very difficult time. **Ray Mahon and family**

We would like to thank our friends, co-workers and ESO for their kind expressions of sympathy and condolences during the recent loss of our father Edward. **Ed, Ken and Karen Walch**

My family and I wish to thank all my co-workers and ESO for their kind expressions of sympathy and support during the recent loss of my father. **Jim Childress**

The family of Vincent Pepitone would like to thank his friends and co-workers at Grumman for their kindness and support during our recent loss. **Gary Pepitone and family**

**Precision Counts.** *At Grumman Allied's LLV plant in Montgomery, Pennsylvania, Dan Harris, a tool and die maker, is working on a new part for a tooling fixture.*



**Things Are Smokin'.** *Construction workers finish up an automated assembly line at the Montgomery plant. The construction firms began turning over segments of the building to Grumman on Monday, March 16. The first LLV is scheduled to roll off the assembly line on April 15.*

**Getting The Big Picture.** *Industrial engineer Ed Lewis works on the layout of the recently renovated Montgomery plant.*

# *Planning Ahead Can Sa Aspirin Later On Down*

MONTGOMERY, Pennsylvania — As contractors put the final touches to the huge plant here, all energy is focused on the April 15. That's the day the first production Long Life Vehicle (LLV) for the U.S. Postal Service rolls off the new automated line here.

On the second floor of offices, plastic sheeting is tacked to wall studs. These temporary walls do little to shield the Grumman engineers from the sounds of construction below. Concrete dust collects on everything — computer screens, shoes and stacks of drawings.

But these little inconveniences will soon pass. On Monday, March 16, the building contractors began turning the various stages of the production line over to Grumman. Training is under way for the people who will build the aluminum-bodied vehicles on Grumman's first automated production line. Inventory is ordered, and tooling fixtures are being installed.

**'Remember, every 5.5 minutes the next vehicle arrives.'**

"Everything is going well, but not without the expected difficulties," says Bob Conniff, plant manager. "Schedules have slipped in several areas, but that's to be expected with a new program of this size."

Conniff's office is panelled with status charts and a huge layout of the newly expanded plant. Some segments of the layout are newer than others and these revisions are glued over the original blueprint.

Directly above his office, several groups of line supervisors and methods and industrial engineers are huddled around computer terminals. Bob Coppola, director of Engineering Operations, calls them the negotiating teams.

"They are working on the line balances," says Coppola. "A supervisor estimates the time it would take his crew to do a job based on inputs from the industrial and methods engineers. Together, they negotiate how long a job will take and where it will be done, making sure there is enough time to do the task. Remember, every 5.5 minutes the next vehicle arrives. You can't have a guy out in the parking lot bucking the last rivet."

If a change is necessary, the methods engineer has to move the task to another workstation and the industrial engineer must change the floor plan layout. "The teams do this step by step," says Coppola. "Say you get down the line and there is a big job to do. Do you move it farther down the line? Or do you try to place the job at the front of the line?

"The domino effect takes place. Move one task and it could affect several other workstations. You have to make sure that all the right people and parts are in the right place. You don't want to put a part on before its time. You have to build flexibility in without sacrificing strict engineering disciplines."

Though it's a friendly negotiating team, occasionally people get animated. They prove their point by acting out the task in question, leaning over to pick up a part, turning to install it, and stepping to the right to act out the role of rivetter. Negotiating the tasks is a painstaking process, but a vital step in setting up a new automated assembly line.

"Through give and take, we've been able to accomplish a lot with our negotiating teams," says Coppola. "Most of the lines have been balanced. We are just finishing up the final assembly line."

Getting the production tools on line is another challenge. At the start of production next month, some interim tools will be used. Though unsophisticated, they will offer repeatability and guaranteed fit. They are not ideal for volume output. Those high-volume tools are being finished by vendors and will be in place by May when daily production begins to pick up.

New equipment is also being installed. One press has a die that weighs 900 tons. The press is large enough to drive your car inside and have it crushed. It will press the LLV's side and back panels.

"Basically, we'll have coils of aluminum coming in the back of the plant and LLVs going out the front," says Coppola.

There will be four automated lines: roof, floor, main body and final assembly. In addition, there will be an automated paint line for small parts where they are etched, cleaned, and painted. These parts will move on an overhead track which looks like the conveyor belt used by dry cleaners.

**'You can't have a guy out in the parking lot bucking the last rivet.'**

Carts carrying the LLV assemblies will travel from workstation to workstation via an inground conveyor belt. Robots will handle the task of painting the LLV body and undercarriage. Huge drive-through ovens will cure the paint. Each completed LLV will go into a "shower shed" to check for waterproofing.

All along the lines, supplies must be fed to each workstation

# 'e A Lot Of 'he LLV Line

team. Timing is critical on automated lines. You can't stop the line because you run out of windshields. "Banks" will be set up at each station. "Banks offer us leeway. Each workstation will have extra assemblies in the bank. So if a mistake is made, you can take the part off and install a new one," says Coppola. "There will be a limited number of parts in each bank, so another person is needed to repair the mistake and keep the banks stocked."

**'The LLV uses a lighter gauge aluminum than Olson trucks.'**

The conveyor belts will move three-and-a-half feet per minute. When the assembly line is running at peak production, 95 LLVs will roll out of the plant each day — one every five and a half minutes.

Right now, Grummanites here are struggling with the "what ifs." What if a robot conks out? What if lightning strikes and knocks out the microprocessors that drive the assembly lines? What if someone accidentally bucks a bad rivet? What about lunch? You can't keep an LLV body in the paint oven for 35 minutes. All these potential headaches must be identified now.

By the end of this month, Grummanites who have been building Olson trucks in nearby Montoursville will begin returning to the Montgomery plant. Everyone is participating in an orientation program. This includes a course in rivetting. "The LLV uses a lighter gauge aluminum than Olson trucks," says Conniff. "The skins are a lot thinner. It's crucial that the rivet is the right dimension or it will rip."

Each member of a workstation team will learn all the tasks that must be performed at that station. "It's the consensus in the industry that to alleviate boredom on an automated assembly line, everyone should be trained in a variety of jobs. That way you don't do the same exact thing for 10 hours straight.

Part of the 20-hour training seminar includes a session on the team concept. "Each day, people will be given the opportunity to discuss workstation problems and come up with solutions," says Tim Gage, Personnel manager.

Over 3,000 people have applied for the 300 or so new jobs at the LLV plant, says Gage. "We'll probably begin hiring in May." New employees will get 40 hours of skills training at the local community college, and then 2.5 days at the Grumman LLV plant.

The LLV job has opened up the job market for Grummanites who work at Montgomery, too. Though the company has had to hire specialists in engineering and industrial areas, most of the newly created production posts are being filled by Grummanites who have been building Olson trucks at the plant for a number of years.

For instance, Sherry Sharr and Ron Morehart used to climb on top of Kurbmasters to spray paint them. They're now leadworkers overseeing the sophisticated robotic paint system. They spent several weeks at the robot manufacturer's factory in Ohio to learn the intricacies of the robots and how to program them.

Several service and support jobs have also opened up. One specific area of job growth is in material management for inventory and material handlers.

"Our job is to supply production," says Jack Bennett, director of Material Management. His department includes inventory control, warehouse, and purchasing. "Small items such as clips may only have to be replenished once a month, but we'll have to deliver seats every hour to the workstations."

**A Proper Fit.** *This LLV is being used by Grumman to test out engineering drawings to make sure parts fit just right. Pictured are Grummanite Tim Milheim of Assembly and Kevin Jones of Arthur Andersen, Inc., a consulting firm.*

While the in-plant deliveries of seats may arrive just in time, Grumman will be using a variation of the Japanese-proven "just-in-time" inventory system. "In Japan, automakers receive deliveries three or four times a day from their suppliers," says Bennett. "However, their suppliers are 10 or 20 miles away. They could deliver every hour if necessary. Meanwhile, our suppliers are all over the country — a majority are east of Chicago. Though our quantities are large by Olson truck standards, we are not a high volume manufacturer compared to the automotive industry. Some automakers produce 65 cars an hour; we will be building 11 trucks an hour during peak production.

"Basically we are going to receive orders more frequently on some items," he says. "For instance, our most expensive items — bumpers, seats and doors — will turn over the fastest. We'll store those right on trailers and move them directly to production. We'll have delivery of bumpers every day and a half, weekly for seats."

For most other items, Bennett predicts that the average inventory on hand will be for 10 to 15 days.

The suppliers are working closely with Grumman. Some have designed racks and carrying fixtures to help the company optimize storage. This in turn cuts down on handling and damage.

As the production date nears, Bennett and his group are adding to their list of foreseeable problems and determining what they can do to avoid them. "The main problem you would encounter is that the suppliers are not in your total control; outside forces can affect them," says Bennett. "If they can't deliver on time, we are in trouble. We've judged our suppliers based on past experience. Plus they have a five-year commitment from us and that helps them plan for raw materials and their own scheduling."

Several weeks ago, 90 percent of the Grummanites here voted to go on a four-day, 10-hour a day work week. The plant will be officially closed for one week in July and the first week of buck hunting season.

Even though the plant shifted over to the four-day week on March 9, most people in the plant have been working seven days. Says Conniff, "We're cautiously optimistic, but there are still a lot of pieces to be pulled together."■

**Balancing The Line.** *At left, Grummanite Dan Feaster, a programmer trainee, looks over a layout of the final assembly area. Above, Linda Snyder, a senior consultant with the firm of Arthur Andersen, Inc., and Grummanite Lou Price, a facilities engineer, discuss how to balance the work at a workstation.*

A. D. Alvar

G. G. Apicella

T. W. Brown

J. J. Bussolini

A. J. Funk

H. W. Giller

G. C. Hennig

T. Hill

# Service Milestones

## 45

**James Donohue**, Assembly, Bohemia, Aircraft Systems
**Frances A. McGunnigle**, Legal, Bethpage, Grumman Corp.
**Francis R. Walton Jr.**, Bldg. Mgmt., Stuart, Aircraft Systems

## 35

**Eugene V. Bagnall Sr.**, Jigs, Details & Subassembly, Calverton, Aircraft Systems
**Vincent Bonomo**, Final Assembly Struct., Bethpage, Aircraft Systems
**Leon M. Chetuck**, Maint., Bethpage, Corporate Services
**Bruce O. Clayton**, Prod. Mgmt., Calverton, Aircraft Systems
**Ralph E. Combes**, Static Test, Bethpage, Aircraft Systems
**Robert S. Demarest Jr.**, Mass Prop. Analysis & Cont., Bethpage, Aircraft Systems
**Francis J. Fox Jr.**, Prog. Mgmt., Melville, Aerostructures
**Richard T. Friedel**, Admin. Ops., Bethpage, Corporate Services
**Christopher Hasenzahl**, Cent. Storage & Retrieval, Aircraft Systems
**Donald A. Imgram**, Adv. Concept Dev., Bethpage, Corporate Services
**Robert H. Irwin**, Jig Details & Subassembly, Bethpage, Aircraft Systems
**John F. Jordan**, Fuselage Joining, Bethpage, Aircraft Systems
**Thomas P. Keegan**, Employee Serv., Bethpage, Corporate Services
**George J. Kikta**, I.E. Flow Seq. Plan., Bethpage, Aircraft Systems
**Frederick A. Knabbe**, Fuselage Assembly, Bethpage, Aircraft Systems
**Slawko S. Kociuruba**, Mach. Struct. & Proto., Bethpage, Aircraft Systems
**Michael F. Lehr**, Tech. Reqmts., Bethpage, Aircraft Systems
**Guido LoDolce**, Mfg. & Matl. Eng., Melville, Aerostructures
**Donald J. Marold**, Invent. Mgmt., Great River, Electronics Systems
**Rita C. Mathia**, Maint. Admin., Bethpage, Corporate Services
**Thomas Palmeri**, Prod. Supervision, Bethpage, Aircraft Systems
**Hamilton Santos**, Machine Ops./Tech. Serv., Bethpage, Aircraft Systems
**Edward F. Schoenfeld**, Ops. Analysis/Study, Woodbury, Data Systems
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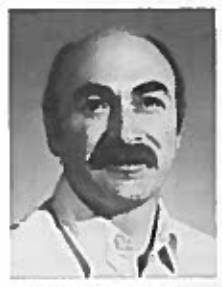
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# *No Small Change: '86 Top Idea Saves $$ On Seats*

Bob Verzera knew a better way to make something just a tiny bit bigger.

Verzera, who works for Central Procurement—Corporate Services Division in Bethpage's Building 30, proposed a simpler way of lengthening a C-2A seat brace. That idea made him top suggester of 1986 in Grumman's Project Sterling employee suggestion program. Sixty-two Grummanites who made innovative suggestions during 1986 were honored March 11 at the 21st annual Project Sterling awards dinner, held at the Milleridge Cottage in Jericho, L.I.

After an engineering change, the C-2A's passenger seat interfered with a bulkhead in the aircraft. So, the brace was made slightly longer. That originally meant cutting the brace in two and installing a plug in its middle. Instead, Verzera suggested moving out the brace's end fittings.

Verzera's way is quicker and cheaper, saving Grumman $85,927 in the first year alone. He won 100 shares of company stock and a world globe clock, in addition to an original award of $6,595.

This was Verzera's first Project Sterling suggestion. Verzera was a major assemblies buyer at the time and is now purchasing manager of machined parts.

Also cashing in on his first suggestion was second-place winner Michael Redding, a technician for Facilities Maintenance, Building 30. He built a test fixture for the Anadex label printers used with Great River, Long Island's automated storage and retrieval system, which stores electronic parts in movable aisles, shelves, and drawers. An operator will call up several in the process of making a kit of electronics assembly parts. The kits get bagged and tagged; the Anadex printers make the labels.

**Idea Elite.** *Aircraft Systems President Renso Caporali presents awards to (from L) Thomas Jones, Michael Redding, and Bob Verzera. (Photos by Marie Trimborn)*

"When they broke down, the label printers had to remain hooked up to a storage aisle so diagnostics could be performed," says Redding. "That slowed down the production of the kits. My test fixture has built-in diagnostics. Now, the operator just replaces the faulty printer with a working one."

Redding earned an initial award of $1,350. As second-place winner for 1986, he received 50 Grumman shares and a brass clock and weather instrument set.

Third place winner was Tom Jones of Building 3, Bethpage. Jones, a stretch/wrap leadworker in the Aircraft Systems Press department, received 30 Grumman shares and weather instruments.

The circuitry inside the Cyril Bath stretch machines' control cabinets was overly sensitive to heat, causing the machines to go out of calibration and make mistakes. Jones proposed installing fans.

This was Jones' seventh suggestion to date, and it won him an initial award of $1,880.

Nine other Grummanites who received awards for 1986:

**Twenty shares:** George Boyle, processor/welder in Electron Beam Welding, Building 2, Aircraft Systems; Leroy Mowbray, senior operator in Router Machining, Building 3, Aircraft Systems; Frank DeMaio, group leader in Integrated Logistics Support, Building 4, Aircraft Systems; Niel Napolitano, group leader for Budgets at Great River, Electronics Systems.

**Ten shares:** Engineer Lawrence Rodenbaugh and technician Philip Bruckner from Building 12's Measurement Standards lab shared a joint suggestion. The other winners were Roy Charletta, an engineer in Aero Test, Building 5; John Gwynne, a project pilot in Flight Test at Calverton; and Gunter Mannerz, material manager at Calverton.

Forty Project Sterling Super-Saver awards were also given out. These awards recognize those Grummanites, besides the Suggesters of the Year, that made highly cost-efficient suggestions. In alphabetical order, and grouped for joint suggestions, they are:

*Aircraft Systems:* Walter Alber, manufacturing engineer, Milledgeville (Ga.) Operations; Wanda Albritton, senior inventory analyst, Stuart (Fla.) Operations; Viola Barker, planner, and William Flanagan, group leader, Material Management, Building 30; Robert Baronowski, numerical control programmer, Machining Operations, Building 3; Brian Becht, standards engineer, Technical Operations, Building 35.

John Byrne, supervisor, Integrated Logistics Support, Building 106, Melville; John Cartmell, engineer, and Joseph Kasten, designer, Engineering, Building 35; Joseph Casalino, section head, Plant Planning, Building 2; Richard Dillon, programmer, Material Management, Building 17; Dewey Doak, senior assembly riveter, Stuart; Hallie Ellerbee, industrial engineer, Milledgeville.

Robert Fritz, machinist, Conventional Machinery, Building 3; Ronald Gilone, project leader, and Morton Kommel, engineering specialist, Integrated Logistics Support, Building 110, Melville; Peter Heilman, engineer, Configuration Data Management, Building 1; Arnold Johnson, engineer, Electromechanical Lines, Building 118, Melville; Joseph Krieger, senior inventory analyst, Production Release and Analysis, Building 1; Fred Marangio, senior inspector, and Corey Hubert, senior operator, Stuart Operations.

Lewis McCormack, staff assistant, Integrated Logistics Support, Building 15; Robert McDowell and Paul Coronato, group leaders, and John Downing, writer, ILS Technical Writing, Building 15, with William Ptucha, specialist, Systems and Controls, Building 25; Paul McCrosson, structural flight test engineer, Flight Test, Calverton; John McNeely, senior methods planner, Milledgeville.

Reno Nicoli, alighting/arm group leader, C-2 Vehicle Engineering, Building 121, Melville; Dominick Ponizo, paint sprayer, Parts Painting, Building 3; Susan Specht, planner, Milledgeville; Stanley Stone, computer systems analyst, Flight Test, Calverton; Stanley Teich, technical specialist, and Victor Gabriele, group leader-engineering, Integrated Logistics Support, Building 110, Melville; Thomas Vitale, advanced planner, Material Management, Building 30.

*Corporate Services*: Bonnie Diamond, buyer, Central Procurement, Building 30; Richard Daggett, buyer, Procurement, Building 30; Robert Hickey, buyer, Central Procurement, Building 30; Augustine Lanzo, director, and Michael DeSanto, deputy director, Communications Administration, Grumman Headquarters; Francis Sallese, Jr., buyer, Central Purchasing, Building 30.

*Electronics Systems*: From Great River — William Belcher, engineer, Engineering Test Technology; Timothy Bianchi, assembler, Printed Circuit Board Fabrication; Francis Finegan, buyer, Central Purchasing; Arthur Gozinsky, buyer, Central Purchasing; Robert Hoffer, group leader, and George DeMatteo, senior numerical control programmer, Methods Engineering; Diane Pecht, manufacturing planner, Requirements Planning; Fred Williams, supervisor, Manufacturing Planning.

From Houston — Theodore Denzler, inspector, Quality Control, Houston Operations.■

## Machining Ops Is Tops

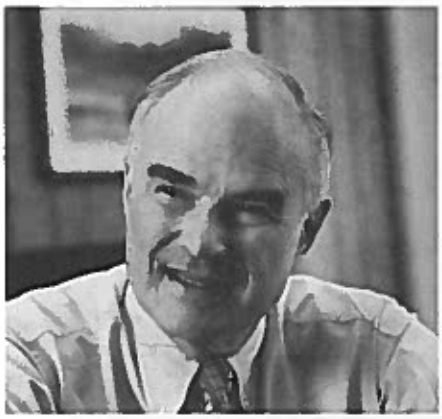
"In these times of high budget deficits, the government is also trying to modernize its defense forces," Renso Caporali, president, Grumman Aircraft Systems Division, told the award recipients. "So, the government turns to the contractor and says, 'okay, we're being squeezed. We'll put the squeeze on you. We have to get more for less.' In order to prosper, we have to respond to that."

The group participation award went to Machining Operations, which has people in Building 3-Bethpage and Glen Arm, Maryland. Grummanites in this group submitted 444 suggestions in 1986, for a participation rate of 72.5 percent.

Overall, Grummanites submitted 2,799 suggestions in 1986, compared to 2,509 in 1985.

**Super Savers.** *Renso Caporali (C) congratulates these Grummanites, who also made highly cost-efficient suggestions in '86.*

# A Letter From The Chairman



A decade ago, Grumman began working on an exciting technology that seemed to have unusual promise. It was a mosaic starer sensor system, a passive system that could be used for surveillance satellites. We knew that nobody else had anything like it. Other companies had comparable systems, but only Grumman incorporated a particular technology that made its approach unique. We had people working on it in New York and at Irvine, California, and progress was steady and encouraging.

Then in 1979, Congress eliminated all funding for this project, because it didn't think the technology could be sufficiently developed to ever be useful.

That was a difficult time, because we had to decide whether we should continue to pour our resources into a program that had no ready buyers. There were a few small study contracts from the Air Force along the way, which helped, but it was still necessary for us to spend a great deal of our own money with no return in sight if the project was to survive.

The $304 million Air Force contract for further development of the Boost Surveillance and Tracking System (BSTS) is all the proof we need that we made the right decision.

The field of competitors has narrowed from four to three to two: Grumman and Lockheed. Air Force Lt. Gen. James Abrahamson is the director of the Strategic Defense Initiative (SDI); BSTS has applications for the SDI program. In a phone call to our Space Systems Division President Alex Alexandrovich, Lt. Gen. Abrahamson said that he was excited about the competition, because the two companies' approaches aren't just copycat variations on the same theme: they will offer the government a real choice.

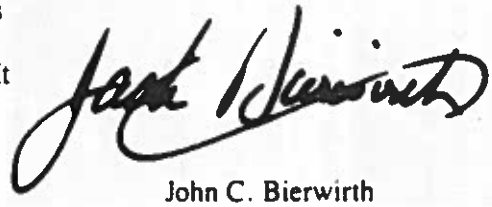
We will have to continue to make investments to develop this technology. There is calculated risk in that, but there are no big wins in business without a certain amount of risk — and we are putting our money on a technology that remains unique.

The BSTS contract is important to us for a number of reasons. It is our largest space-related contract since we built the Lunar Module. It continues 30 years of work in developing systems for defense surveillance and countermeasures.

The theme of our new annual report to shareholders is, "If you look inside, you'll think we're an electronics company." Our central business remains the electronics systems aircraft — but we believe that the way to grow is to apply that expertise to other electronics systems requirements.

Our belief that the electronics inside are as important as the platform that carries them is confirmed by something interesting in the BSTS competition. Usually, the company that builds the satellite is the prime, and the electronics manufacturers and integrators are the subcontractors. But in our proposal, the prime — Grumman — will develop the sensors and integrate these with the spacecraft; the spacecraft will be built by Rockwell, one of our four subcontractors.

But, most important of all, the BSTS program has been described as a national asset. We all know that controversy surrounds the Strategic Defense Initiative. But even if the SDI program were to be cancelled tomorrow, there would still be a need for BSTS. As a silent sentry in space, it will provide a way to monitor arms limitation and verify treaty compliance, and to safeguard peace in the world.



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(Photo by Bob Settles)

# The Tension Builds

Technician Herb Gilcher is using a Baldwin Universal Testing System to destroy a small sample of metal.

Gilcher works in Grumman's Metallurgical Lab in Building 10, Bethpage. The metal sample is being pulled apart to determine its tensile stength. When it breaks, the computer will record the force exerted and will automatically calculate the metal's strength.

In this particular test, Gilcher verifies that after heat-treatment, a material meets certain strength specifications. These are established for every metal used to make Grumman aircraft parts. All types of aluminum, steel and titanium get tested in this fashion. For other types of tests, the machine can move its jaws in the other direction, smashing a sample.

Testing is done of all lots of metal purchased by Grumman before they enter the production cycle.

The tester's two pipe-like structures extend through the lab's ceiling and hold its jaws.